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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,192	02/12/2004	Torbjorn Sandstrom	2674-000003/US/COA	2748
30593	7590	04/12/2005	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C. P.O. BOX 8910 RESTON, VA 20195			CHOI, WILLIAM C	
			ART UNIT	PAPER NUMBER
			2873	

DATE MAILED: 04/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<p>Application No.</p> <p align="center">10/776,192</p>	<p>Applicant(s)</p> <p align="center">SANDSTROM, TORBJORN</p>	
	<p>Examiner</p> <p align="center">William C. Choi</p>	<p>Art Unit</p> <p align="center">2873</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 January 2005.
- 2a) ☒ This action is FINAL.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-7,9-11,13-17,19-21 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,9-11,13-17,19-21 and 23-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2004 & 2 November 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/623,195.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date: _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 17, 19-21 and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (U.S. 5,929,977).

In regard to claim 17, Ozawa discloses an apparatus for creating a pattern on a photosensitive workpiece (column 1, lines 33-48, Figure 3), comprising: a light source for emitting light flashes in the wavelength range from EUV to IR (column 2, lines 49-55, Figure 3, "1"), a projection system for directing the emitted light to the workpiece (column 4, lines 9-14, Figure 3, "13") and a control system arranged to control a trigger signal to the light source for emitting the light flashes, wherein a trigger signal timing is varied to compensate for flash-to-flash time jitter in said light source (column 4, line 62 – column 5, line 51, Figure 3, "21, 26" and column 10, lines 52-65, Figure 5B).

Regarding claim 19, Ozawa discloses wherein the electronic control system is arranged to control a time offset of the trigger signal (column 4, line 62 – column 5, line 51 and column 10, lines 52-65, Figure 5B).

Regarding claim 20, Ozawa discloses wherein the offset value is estimated based on a measured delay between a trigger signal and a resulting exposure for at least one of the latest exposure (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B).

In regard to claim 21, Ozawa discloses a method for creating a pattern on a workpiece sensitive to light radiation (column 1, lines 33-48, Figure 3), comprising: emitting light flashes in the wavelength range from EUV to IR (column 2, lines 49-55, Figure 3, "1"), projecting the emitted light on the workpiece (column 4, lines 9-14, Figure 3, "13"), controlling a trigger signal for emitting the light flashes so that a trigger signal timing is varied to compensate for flash-to-flash time jitter (column 4, line 62 – column 5, line 51, Figure 3, "21, 26" and column 10, lines 52-65, Figure 5B).

Regarding claim 23, Ozawa discloses wherein a time offset of the trigger signal is controlled (column 4, line 62 – column 5, line 51 and column 10, lines 52-65, Figure 5B).

Regarding claim 24, Ozawa discloses wherein the offset value is estimated based on a measured delay between a trigger signal and a resulting exposure for at least one of the latest exposures (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B).

In regard to claim 25, Ozawa discloses an apparatus for creating a pattern on a photosensitive workpiece (column 1, lines 33-48, Figure 3) comprising: a light source for emitting light flashes in the wavelength range from EUV to IR (column 2, lines 49-55, Figure 3, "1"), a projection system for directing the emitted light to the workpiece

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(column 4, lines 9-14, Figure 3, "13"), and a control system arranged to control a trigger signal to the light source for emitting the light flashes, wherein, during scanning, the control system measures a delay between a previous trigger signal and a resulting exposure to determine a timing of a subsequent trigger signal (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B).

Regarding claim 26, Ozawa discloses wherein the electronic control system is arranged to control a time offset of the subsequent trigger signal (column 4, line 62 – column 5, line 51 and column 10, lines 52-65, Figure 5B).

In regard to claim 27, Ozawa discloses method for creating a pattern on a workpiece sensitive to light radiation (column 1, lines 33-48, Figure 3), comprising: emitting light flashes in the wavelength range from EUV to IR (column 2, lines 49-55, Figure 3, "1"), projecting the emitted light on the workpiece (column 4, lines 9-14, Figure 3, "13"), and during scanning, measuring a delay between a previous trigger signal and a resulting exposure to determine a timing for a subsequent trigger signal (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B).

Regarding claim 28, Ozawa discloses wherein a time offset of the subsequent trigger signal is controlled (column 4, line 62 – column 5, line 51 and column 10, lines 52-65, Figure 5B).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-7, 9-11 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa in view of Nelson (U.S. 5,523,193).

In regard to claim 1, Ozawa discloses an apparatus for creating a pattern on a workpiece sensitive to light radiation (column 1, lines 33-48, Figure 3), comprising: a light source for emitting light flashes in the wavelength range from EUV to IR (column 2, lines 49-55, Figure 3, "1"), a projection system creating an image on the workpiece (column 4, lines 9-14, Figure 3, "13"), a precision mechanical system for positioning said workpiece and/or projection system relative to each other (column 4, lines 22-41, Figure 3, "15, 16, 18"), and an electronic control system controlling the position of the workpiece (column 4, lines 22-41, Figure 3, "17") and the intensity of the radiation (column 5, lines 3-51, Figure 3, "26" and Figures 7A, B), so that said pattern is printed on the workpiece, wherein said electronic control system is further arranged to control a trigger signal to the light source for emitting the light flashes, so that a trigger signal timing is varied to compensate for flash-to-flash time jitter in said light source (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B), but does not specifically disclose a spatial light modulator (SLM) having a multitude of modulating elements (pixels) adapted to being illuminated by said radiation, an

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electronic data processing and delivery system converting said pattern to modulator signals, wherein the control system feeds the signals to the modulator and an image of the of the modulator is projected on the workpiece.

Within the same field of endeavor, Nelson teaches that it is desirable to implement a spatial light modulator (SLM) having a multitude of modulating elements (pixels), adapted to being illuminated by said radiation (column 3, lines 61-66, Figure 2, "50"), an electronic data processing and delivery system converting said pattern to modulator signals, and feeding the signals to the modulator (column 3, lines 66-67 and column 4, line 57 – column 5, line 6, Figure 2, "52"), wherein the control system would inherently feed the signals to the modulator, in place of a mask system (Figure 3, i.e. as disclosed in Ozawa), for the purpose of reducing cost of mask fabrication and for faster production time of workpieces (column 2, lines 9-37 and column 3, line 52 – column 5, line 21, Figure 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the apparatus of Ozawa to comprise the claimed components since Nelson teaches that it is desirable to do so for the purpose of reducing cost of mask fabrication and for faster production time of workpieces.

Regarding claim 3, Ozawa discloses wherein the electronic control system is arranged to control a time offset of the trigger signal (column 4, line 62 – column 5, line 51 and column 10, lines 52-65, Figure 5B).

Regarding claim 4, Ozawa discloses wherein the offset value is estimated based on a measured delay between a trigger signal and a resulting exposure for at least

one of the latest exposure (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B).

Regarding claim 5, Ozawa discloses whereby the light source is a laser (column 2, lines 49-55, Figure 3, "1").

Regarding claim 6, Ozawa discloses where the pattern is formed in photoresist (column 4, lines 5-14, Figure 3, "14").

In regard to claim 7, Ozawa discloses a method for creating a pattern on a workpiece sensitive to light radiation (column 1, lines 33-48, Figure 3), comprising: emitting light flashes in the wavelength range from EUV to IR (column 2, lines 49-55, Figure 3, "1"), controlling the emitted radiation and the positioning of the workpiece in relation to the projected image, based on a digital description of the pattern to be written, so that said pattern is printed on the workpiece. so that said pattern is printed on the workpiece (column 4, lines 22-41, Figure 3, "15-18" and column 5, lines 3-51, Figure 3, "26" and Figures 7A, B), wherein controlling the emitted radiation involves controlling a trigger signal for emitting the light flashes so that a trigger signal timing is varied to compensate for flash-to-flash time jitter (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B), but does not specifically disclose modulating the emitted light with a spatial light modulator (SLM) having a multitude of modulating elements (pixels), projecting an image of the modulator on the workpiece and controlling the modulator.

Within the same field of endeavor, Nelson teaches that it is desirable to modulate the emitted light with a spatial light modulator (SLM) having a multitude of modulating

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elements (pixels) (column 3, lines 61-66, Figure 2, "50"), projecting an image of the modulator on the workpiece (column 4, lines 1-5) and controlling the modulator so that said pattern is printed on the workpiece (column 4, line 57 – column 5, line 6), for the purpose of reducing cost of mask fabrication and for faster production time of workpieces (column 2, lines 9-37 and column 3, line 52 – column 5, line 21, Figure 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of Ozawa to comprise the claimed limitations since Nelson teaches that it is desirable to do so for the purpose of reducing cost of mask fabrication and for faster production time of workpieces.

Regarding claim 9, Ozawa discloses wherein a time offset of the trigger signal is controlled (column 4, line 62 – column 5, line 51 and column 10, lines 52-65, Figure 5B).

Regarding claim 10, Ozawa discloses wherein the offset value is estimated based on a measured delay between a trigger signal and a resulting exposure for at least one of the latest exposures (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B).

In regard to claim 11, Ozawa discloses an apparatus for creating a workpiece sensitive to light radiation (column 1, lines 33-48, Figure 3), comprising a light source for emitting light flashes in the wavelength range from EUV to IR (column 2, lines 49-55, Figure 3, "1"), a projection system for creating an image of the modulator on the workpiece (column 4, lines 9-14, Figure 3, "13"), and an electronic control system controlling the position of the image created on the workpiece and the intensity of the

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radiation, in accordance with an intended pattern to be printed (column 4, lines 22-41, Figure 3, "15-18" and column 5, lines 3-51, Figure 3, "26" and Figures 7A, B) and further arranged to control a trigger signal to the light source for emitting the light flashes so that a trigger signal timing is varied to compensate for flash-to-flash time jitter in said light source (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B), but does not specifically disclose a spatial light modulator (SLM) having a multitude of modulating elements (pixels) adapted to being illuminated by said radiation and an electronic control system controlling the modulation elements of the modulator.

Within the same field of endeavor, Nelson teaches that it is desirable to modulate the emitted light with a spatial light modulator (SLM) having a multitude of modulating elements (pixels) (column 3, lines 61-66, Figure 2, "50") adapted to being illuminated by said radiation (column 3, lines 61-66, Figure 2, "50") and electronically controlling the modulator so that said pattern is printed on the workpiece (column 4, line 57 – column 5, line 6), for the purpose of reducing cost of mask fabrication and for faster production time of workpieces (column 2, lines 9-37 and column 3, line 52 – column 5, line 21, Figure 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of Ozawa to comprise the claimed limitations since Nelson teaches that it is desirable to do so for the purpose of reducing cost of mask fabrication and for faster production time of workpieces.

Regarding claim 13, Ozawa discloses wherein the electronic control system is arranged to control a time offset of the trigger signal (column 4, line 62 – column 5, line 51 and column 10, lines 52-65, Figure 5B).

Regarding claim 14, Ozawa discloses wherein the offset value is estimated based on a measured delay between a trigger signal and a resulting exposure for at least one of the latest exposure (column 4, line 62 – column 5, line 67, Figures 1 & 2 and column 10, lines 52-65, Figure 5B).

Regarding claim 15, Ozawa discloses whereby the light source is a laser (column 2, lines 49-55, Figure 3, "1").

Regarding claim 16, Ozawa discloses where the pattern is formed in photoresist (column 4, lines 5-14, Figure 3, "14").

### ***Response to Arguments***

Applicant's arguments with respect to claims 1, 3-7, 9-11, 13-17, 19-21, 23 and 24 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Choi whose telephone number is (571) 272-2324. The examiner can normally be reached on Monday-Friday from about 9:00 am to 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Y. Epps can be reached on (571) 272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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Business Center (EBC) at 866-217-9197 (toll-free).

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